Subject: Quadratic Inequalities

Time:10 Minutes
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Directions (1-10): इनमें से प्रत्येक प्रश्न में, दो समीकरण (I) और (II) दिए गए हैं। दोनों समीकरणों को हल करें और उत्तर दीजिए-

(a) यदि $x > y$
(b) यदि $x \geq y$
(c) यदि $x < y$
(d) यदि $x \leq y$
(e) यदि $x = y$ या x और y के बीच कोई संबंध स्थापित नहीं किया जा सकता है

Q1. I. $2x^2 - 7x + 6 = 0$
  II. $6y^2 - 11y + 3 = 0$
L1Difficulty 3
QTags Quadratic Inequalities
QCreator Deepak Rohilla

Q2. I. $12x^2 + 16x - 3 = 0$
II. $6y^2 - 25y + 4 = 0$
L1Difficulty 3
QTags Quadratic Inequalities
QCreator Deepak Rohilla

Q3. I. $3x^2 + x - 2 = 0$
II. $2y^2 + 5y - 3 = 0$
L1Difficulty 3
QTags Quadratic Inequalities
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Q4. I. $5x^2 + 11x + 2 = 0$
II. $3y^2 + 11y + 10 = 0$
L1Difficulty 3
QTags Quadratic Inequalities
QCreator Deepak Rohilla

Q5. I. $16x^2 = 16x - 4$
II. $4y^2 - 9y + 5 = 0$
L1Difficulty 3
QTags Quadratic Inequalities
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Q6. I.$x^2 - 36 = 0$

   II. $(y - 3)^2 = 0$

L1Difficulty 3

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Q7.I. $6x^2 - 5x - 21 = 0$

   II.$2y^2 - 19y + 35 = 0$

L1Difficulty 3

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Q8. I.$2x^2 - x - 15 = 0$

II.$y^2 - 7y + 12 = 0$

L1Difficulty 3

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Q9. I.$2x^2 - 5\sqrt{3}x + 6 = 0$

   II.$15y^2 - 8\sqrt{3}y + 3 = 0$

L1Difficulty 3

QTags Quadratic Inequalities

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Q10. I.$2x^{\frac{3}{2}} + 21x^{-\frac{1}{2}} = 13x^{\frac{1}{2}}$

   II.$6y^2 - 19y + 15 = 0$

L1Difficulty 3

QTags Quadratic Inequalities

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Directions (11-15): निम्नलिखित प्रश्नों में दो समीकरण I और II दिए गए हैं। दोनों समीकरण को हल करें और उत्तर दीजिए-

   I. $6p^2 + 5p + 1 = 0$

   II. $20q^2 + 9q = -1$

Q11.

(a) यदि $p > q$

(b) यदि $p \geq q$

(c) यदि $p < q$

(d) यदि $p \leq q$

(e) यदि $p = q$ या संबंध स्थापित नहीं किया जा सकता है।

L1Difficulty 3

I. $3p^2 + 17p + 10 = 0$

Q12. II. $10q^2 + 9q + 2 = 0$

(a) यदि p > q
 (b) यदि p ≥ q
 (c) यदि p < q
 (d) यदि p ≤ q
 (e) यदि p = q या संबंध स्थापित नहीं किया जा सकता है।

L1Difficulty 3

I. $p^2 + 24 = 10p$

Q13. II. $2q^2 + 18 = 12q$

(a) यदि p > q
 (b) यदि p ≥ q
 (c) यदि p < q
 (d) यदि p ≤ q
 (e) यदि p = q या संबंध स्थापित नहीं किया जा सकता है।

L1Difficulty 3

I. $5p + 2q = 96$

Q14. II. $3(7p + 5q) = 489$

(a) यदि p > q
 (b) यदि p ≥ q
 (c) यदि p < q
 (d) यदि p ≤ q
 (e) यदि p = q या संबंध स्थापित नहीं किया जा सकता है।

L1Difficulty 3

I. $\frac{15}{\sqrt{p}} - \frac{9}{\sqrt{p}} = p^{\frac{1}{2}}$

Q15. II. $q^{10} - (36)^5 = 0$

(a) यदि p > q

(b) यदि p ≥ q
(c) यदि p < q
(d) यदि p ≤ q
(e) यदि p = q या संबंध स्थापित नहीं किया जा सकता है।
L1Difficulty 3
QTags Quadratic Inequalities
QCreator Deepak Rohilla

Solutions

S1. Ans.(b)
Sol.
I. $2x^2 – 7x + 6 = 0$
      $2x^2 – 4x – 3x + 6 = 0$
      $2x (x – 2) – 3 (x – 2) = 0$
      $x = \frac{3}{2}, 2$
II. $6y^2 – 11y + 3 = 0$
      $6y^2 – 9y – 2y + 3 = 0$
      $3y (2y – 3) – 1 (2y – 3) = 0$
      $y = \frac{1}{3}, \frac{3}{2}$
      $x ≥ y$

S2. Ans.(d)
Sol.
I. $12x^2 + 16x – 3 = 0$
      $12x^2 + 18x - 2x – 3 = 0$
      $6x (2x + 3) - 1 (2x + 3) = 0$
      $x = \frac{1}{6} , -\frac{3}{2}$
II. $6y^2 – 25y + 4 = 0$
      $6y^2 – 24y – y + 4 = 0$
      $6y (y – 4) – 1 (y – 4) = 0$
      $y = \frac{1}{6}, 4$
∴ $y ≥ x$

S3. Ans.(e)
Sol.
I. $3x^2 + x – 2 = 0$
      $3x^2 + 3x - 2x – 2 = 0$
      $3x (x + 1) - 2 (x + 1) = 0$
      $x = -1 , \frac{2}{3}$

II. $2y^2 - 5y – 3 = 0$
      $2y^2 + 6y – y – 3 = 0$

2y (y + 3) – 1 (y + 3) = 0

$y = \frac{1}{2}, -3$

∴no relation

S4. Ans.(e)

Sol.

I. $5x^2 + 11x + 2 = 0$

    $5x^2 + 10x + x + 2 = 0$

    5x (x + 2) + 1 (x + 2) = 0

    $x = -\frac{1}{5}, -2$

II. $3y^2 + 11y + 10 = 0$

    $3y^2 + 5y + 6y + 10 = 0$

    y (3y + 5) + 2 (3y + 5) = 0

    $y = -\frac{5}{3}, -2$

∴ no relation

S5. Ans.(c)

Sol.

I. $16x^2 = 16x - 4$

    $16x^2 – 8x – 8x + 4 = 0$

    8x (2x – 1) – 4 (2x – 1) = 0

    $x = \frac{1}{2}, \frac{1}{2}$

II. $4y^2 - 9y + 5 = 0$

    $4y^2 - 5y - 4y + 5 = 0$

    y (4y - 5) - 1 (4y - 5) = 0

$y = \frac{5}{4}, 1$

∴ y > x

S6. Ans(e)

Sol.

    I. $x^2 - 36 = 0$

$$x^2 = 36$$
$$x = \pm 6$$

    II. $(y - 3)^2 = 0$

        y=3

        so, no relation between x and y

S7. Ans(c)

sol.

    I. $6x^2 - 5x - 21 = 0$

      $6x^2 - 14x + 9x - 21 = 0$

$$(2x + 3)(3x - 7) = 0$$

$$x = -\frac{3}{2}, \frac{7}{3}$$

II. $2y^2 - 19y + 35 = 0$

$$2y^2 - 14y - 5y + 35 = 0$$
$$(2y - 5)(y - 7) = 0$$
$$y = 7, \frac{5}{2}$$

So, $x < y$

S8. Ans(d)
Sol.
I. $2x^2 - x - 15 = 0$

$$2x^2 - 6x + 5x - 15 = 0$$
$$(x - 3)(2x + 5) = 0$$
$$x = 3, -\frac{5}{2}$$

II. $y^2 - 7y + 12 = 0$

$$y^2 - 4y - 3y + 12 = 0$$
$$(y - 4)(y - 3) = 0$$
$$y = 3, 4$$

So, $x \leq y$

S9. Ans (a)
Sol.
I. $2x^2 - 5\sqrt{3}x + 6 = 0$
$2x^2 - 4\sqrt{3}x - \sqrt{3}x + 6 = 0$
$(x - 2\sqrt{3})(2x - \sqrt{3}) = 0$
$x = 2\sqrt{3}, \frac{\sqrt{3}}{2}$

II. $15y^2 - 8\sqrt{3}y + 3 = 0$
$15y^2 - 5\sqrt{3}y - 3\sqrt{3}y + 3 = 0$
$(\sqrt{3}y - 1)(5\sqrt{3}y - \sqrt{3}) = 0$
$y = \frac{1}{\sqrt{3}}, \frac{\sqrt{3}}{5}$

So, $x > y$

S10. Ans (a)
Sol.
I. $2x^{\frac{3}{2}} + 21x^{-\frac{1}{2}} = 13x^{\frac{1}{2}}$

$$2x^2 - 13x + 21 = 0$$
$$2x^2 - 7x - 6x + 21 = 0$$

$$(2x - 7)(x - 3) = 0$$
$$x = 3, \frac{7}{2}$$

II. $6y^2 - 19y + 15 = 0$

$$6y^2 - 9y - 10y + 15 = 0$$

$(3y - 5)(2y - 3) = 0$

$$y = \frac{5}{3}, \quad \frac{3}{2}$$

So, $x > y$

S11. Ans.(c)

Sol.

$6p^2 + 5p + 1 = 0$

$6p^2 + 3p + 2p + 1 = 0$

$3p(2p + 1) + 1(2p + 1) = 0$

$\Rightarrow p = \frac{-1}{3}, \frac{-1}{2}$

$20q^2 + 9q + 1 = 0$

$\Rightarrow 20q^2 + 5q + 4q + 1 = 0$

$5q(4q + 1) + 1(4q + 1) = 0$

$\Rightarrow q = \frac{-1}{5}, \frac{-1}{4}$

$\therefore p < q$

S12. Ans.(c)

Sol.

$3p^2 + 17p + 10 = 0$

$3p^2 + 15p + 2p + 10 = 0$

$3p(p + 5) + 2(p + 5) = 0$

$\Rightarrow p = -5, \frac{-2}{3}$

$10q^2 + 9q + 2 = 0$

$\Rightarrow 10q^2 + 5q + 4q + 2 = 0$

$5q + (2q + 1) + 2(2q + 1) = 0$

$\Rightarrow q = \frac{-2}{5}, \frac{-1}{2}$

$\therefore p < q$

S13. Ans.(a)

$p^2 + 24 = 10p$

$\Rightarrow p^2 - 10p + 24 = 0$

$p^2 - 6p - 4p + 24 = 0$

$p(p - 6) - 4(p - 6) = 0$

$\therefore p = 6, 4$

$2q^2 + 18 = 12q$

$\Rightarrow 2q^2 - 12q + 18 = 0$

$2q^2 - 6q - 6q + 18 = 0$

$\Rightarrow 2q(q - 3) - 6(q - 3) = 0$

$\Rightarrow q = 3, 3$

Sol. $\therefore p > q$

S14. Ans.(a)

$5p + 2q = 96$ ....(× 5)

$7p + 5q = \frac{489}{3} = 163$ ....(× 2)

$\Rightarrow 25p + 10q = 480$ ...(i)

$14p + 10q = 326$ ...(ii)

Subtract (ii) from (i)

$11p = 480 - 326$

$\Rightarrow p = \frac{154}{11} = 14$

Now, $5p + 2q = 96$

$2q = 96 - 5 \times 14$

$q = \frac{96-70}{2} = 13$

Sol. $\therefore p > q$

S15. Ans.(b)

$\frac{15}{\sqrt{p}} - \frac{9}{\sqrt{p}} = p^{\frac{1}{2}}$

$\Rightarrow 6 = \sqrt{p} \times \sqrt{p}$

$p = 6$

$q^{10} - (36)^5 = 0$

$q^{10} = (6^2)^5$

$\Rightarrow q = \pm 6$

Sol. $\therefore p \geq q$